

JPRS 79000

17 September 1981

# USSR Report

CONSTRUCTION AND EQUIPMENT

No. 46

**FBIS**

FOREIGN BROADCAST INFORMATION SERVICE

#### NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

#### PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

17 September 1981

USSR REPORT  
CONSTRUCTION AND EQUIPMENT

No. 46

## CONTENTS

## CONSTRUCTION

Republic, City Plans, Problems Aired (Various sources, various dates) .....	1
Main Moscow Construction Administration, by K. Magnushevskiy Estonian Construction Program, by R. Kvell	
Leningrad: Land Use Planning (G. Buldakov; ARKHITEKTURA SSSR, Jun 81) .....	12
Kazakh SSR Construction Organization Efficiency Analyzed by MISI NII OUS (R. M. Merkin, O. M. Beysenov; IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR. SERIYA OBSHCHESTVENNYKH NAUK, May-Jun 81) .....	22
Automated Management System for Construction Units (N. Vetelkin; KRASNAYA ZVEZDA, 13 May 81) .....	31

NOTE: At the June 1981 Session of the Supreme Soviet considerable attention was given to the housing industry. For the speeches of the representatives see: JPRS 78857, 28 August 1981, USSR REPORT: POLITICAL AND SOCIOLOGICAL AFFAIRS, No 1166.

## CONSTRUCTION

### REPUBLIC, CITY PLANS, PROBLEMS AIRED

#### Main Moscow Construction Administration

Moscow MOSKOVSKAYA PRAVDA in Russian 31 May 81 p 2

[Two-Part article by K. Magnushevskiy: "Why the Giant's Step is Small; What is Hampering the Main Moscow Construction Administration from Working More Productively"]

[31 May 81 p 2]

[Text] It is difficult to overestimate the role that builders and construction industry workers play in developing a base for all the sectors of industry and the municipal economy and in satisfying the needs of Muscovites. They will accomplish a huge range of housing, social and cultural construction and more and more housing units are being built from new advanced series with an improved floorplan. Much work is being done to adopt the Common Catalogue of Standard Products which makes it possible to achieve exterior variety and architectural expressiveness in areas where there are massive structures.

Along with this, in order to be at the level of the programs that were set by the 26th Party Congress, the participants in the Moscow construction production organizational structure must solve a number of problems. The topic below is about several of them.

#### 1.

"Another day further behind," said the construction superintendent at one of the construction sites in Strogan in a tired voice. "I am tired and what's the sense of it? Since this morning it seems as if I'm headed to destruction--they did not bring the mortar, they delivered parts an hour late, the foreman also has claims against them, and the director of the administration reproached me on the telephone--you are behind schedule. And I'm an engineer; I would rather think about something else--how to better organize labor and about the same NOT [scientific organization of labor]."

He sighed distressed; I will not mention the last name of the construction superintendent since thousands of others of his fellow workers will say approximately the same thing.

The Plan Is Not Dogma But...

As was said at the 26th Party Congress responsibility for completing the plan is now being repeatedly augmented and it was emphasized that the plan is realistic and balanced.



The deep-rooted practice of revising programs was given categorical blame. To speak frankly, such phenomena do not take place in the main administration, unfortunately, without the active participation of Gosplan, GlavUKS [Main Capital Construction Administration] and GlavAPU [Main Architectural Design Administration].

Here is how this appears in the construction organization that is second in the main administration according to its capabilities--the Moscow State Housing Construction Association (MGOZhS). Formation of the work plan for the following year is usually begun in May of the current year but its final version (and this is not always) appears only in...March of the planned year. This is what occurred this year. The last version of the plan is extremely different from the first. In the beginning for example, it was proposed that 99 buildings intended for cultural and everyday purposes be built, then their number increased by 4 and, finally, was reduced to...20. The association's program was first "fattened" by 8 to 10 million rubles, then "trimmed" by the same sum.

Along with this, many structures were thus not provided with design and technical documentation. And much is hidden behind this--late, incorrect and insufficient planning, unbalanced programs for trusts and administrations for growth in labor productivity, profitability and income, and the firm long range outlook of providing materials and technology is excluded. Due to this it is often not within the power of associations, trusts and general contractor administrations to enter into firm planning relationships with subcontractor organizations.

This concerns not only structures intended for cultural and everyday purposes but also housing construction programs. For example, just recently the Moscow State Planning Administration again sharply changed its structure--the construction plan for the Voroshilov Rayon was reduced by almost a half million rubles and the timetables for putting kindergartens into use were changed. Does it pay to be surprised that in MGOZhS alone two departments are also revising such programs by months and are inserting 40 or more changes into each version? Such planning deprives one of the possibility of building up a stockpile. MGOZhS and UZhS-2 [Housing Construction Administration-2] entered the new year without one anticipatory program that was more or less in good order and UZhS had in reserve...one housing unit. Such planning gives rise to irresponsibility among builders also. Can one really reject, for example, the following reasoning--since the plan and things change then the demand for it to be completed is not great.

The instability of plans and the overextension of funds associated with this has brought about yet another phenomenon. It may be called the deconcentration of resources. For example, there are 30 construction administrations with an annual program of two or less million rubles even now in MGOZhS, and the number of their staff fluctuates from 150 to 200 workers. The organizational structure of UZhS-1 and UZhS-2 looks about the same. Meanwhile, practice shows that construction administrations must have a minimum of 250 workers to totally build microrayons. Only in this case is it possible to form completely equipped crews that are capable of steadily building up production capacities. But changes are inserted in the plan, which has become a chronic phenomenon, and forces administrations to break up crews. Almost a third of the completely equipped crews in MGOZhS and even in the main administration as a whole do not have a total complement of workers. Such crews do erection work five to seven floors behind schedule. This is reflected in the brigade contract method especially painfully.

You can imagine what potentials for the growth in output are wasted in the main administration and its subdivisions if even under such operating conditions in MGOZhS, for example, the annual increase in products comprises almost one fourth. As they say in the association, if losses are reduced, capacities increase by a factor of one and a half.

#### What Supports the NII?

Besides the direct producers of the final product--construction subdivisions--the main administration has, as before, sufficiently powerful scientific and technical organizations--"NII[Scientific Research Institute]Mosstroy," "Mosorgstroy," "TsNIB[Central Normative Research Bureau]Mosstroy," "SKB[Special Design Bureau]Mosstroy," and ASUS [Automatic Control Systems of Construction] in which more than 2,000 scientific workers, engineers, technologists, economists and planners are working. Their task is to implement technical policy, improve the management of production and the process of work itself and to adopt innovations. It must be said that each of these organizations has given and is giving quite a bit to improve construction production. Yet all the same, only half, at best, of their scientific and technological potential is being used, as was recently stated by the speakers at a meeting of the most prominent members of the main administration.

The report of the work of "NIIMosstroy," the same age as the main administration, is a labor of several hundred pages and we will not attempt the task of giving an evaluation of all of the activities of its collective. But it must be said that practice raises quite a few claims against the scientists. There are more than enough examples. At one time, for example, scientific workers found a successful method of pouring concrete under severe frost conditions--they proposed putting an additive into the material and the matter went forward. But here is the problem--at present you will not find this component with a light in the daytime. Yet the scientific subject is considered finished. Construction workers themselves are looking for a way out of the situation while the institute is silent. Here is another example. According to the plan the institute should render assistance to the subdivisions of the Main Moscow Construction Administration in developing a final construction plan according to the new method associated with the transfer to the new indicator--construction commodity production. As we were told at MGOZhS the institute has not helped in any way with this problem. And there are dozens of such examples.

The "Mosorgstroy" Trust's organizations are no less powerful although younger than the institute. According to the plan hundreds of its specialists should be creators and tenacious conductors of advanced expertise. Again we say that quite a bit has been done but the work for regulating construction is insufficient by far. Now the trust is engaged in creating different types of installation devices, correcting drawings for a traverse instrument, reviewing design documentation, its specialists are spending much time on collecting report data and so forth. At the same time the most important thing is missing in the trust's plan (and it was for attaining this goal that it was formed)--the creation and adoption of a system of completely (we emphasize this) providing construction sites with organization and technology. Isn't this one of the reasons for the low quality of work?

Workers in MGOZhS report--in order to adopt advanced methods of work the main administration ordered directors of this trust to designate seven curators to render practical

assistance to the association, in particular to improve the quality of finish work for apartments. But two to three specialists appear here now and then and even these are only engaged in the collection of data to prepare a report for the main administration. The intermediary role of "Mosorgstroy"--preparing reports and creating schemes for work production which, incidentally, still do not have full weight at construction sites--can hardly satisfy builders. The trust has almost completely excluded the brigade contract method from its plans.

As to the "TsNIB-Mosstroy," whose work interlocks with that of "Mosorgstroy's" in many ways, it has now "withered." Quite a bit of time is given here to creating overall NOT plans by structure--very important documents especially for the brigade contract method. But they are implemented, we dare to say, on a low level. In one of the orders for the main administration it was noted that during the past year 95 brigades did not resume the brigade contract method and many trusts did not complete the programs for adopting brigade cost accounting. Working out the standard adoption of the brigade contract method and charts of labor processes was imposed as the bureau's obligation by this same order.

And what then? They reported in MGOZhS that even now there are no charts for electrical installation, plumbing and finish work. Associations and other subdivisions in the main administration have not even been completely provided with...blanks for filling out the materials to adopt the brigade contract method and NOT. Up to the present time outmoded calculations are being used at many construction sites which "TsNIB-Mosstroy" has no intention of reviewing. There are also no regulations and documentation for calculating the economic effectiveness of the brigade contract method in specialized trusts due to which brigades cannot conclude contract agreements.

As to the ASUS, the level of management and control here has not changed in the time since the article "Anxious Calls to the Dispatcher's Office" was published in our newspaper. In the two-year plans for construction that are being worked out in ASUS, 15 to 22 percent of the structures that are being built remain "after spillage" without resources.

How is this so? Excellent resolutions have been approved and the number of documents regulating construction production has increased by 10 to 15 percent in recent years but the main administration's step has increased only a little and the loss of time and labor has remained at the previous level. This is occurring not only due to the instability of plans, as we see, but also because the scientific and technological organizations, which at times either occupy the position of inert observers or limit their work to the collection of information for reports, are still only operating at half strength. The main administration's technical administration that is called upon to direct and aim sector science toward solving the most urgent problems is also only compiling reports and practically does not affect the content of the "scientific portfolio" of these organizations.

There are other reasons. More about this in the next article.



[2 Jun 81 p 2]

[Text]

#### A Reserve Supply While Taking a Loss

The new indicator for planning and evaluating the activity of builders--construction commodity production--has begun to live and be accepted in the Main Moscow Construction Administration. And a chronic "illness" is particularly acute--the imperfection of the organizational, economic and legal interrelationships between the square: the Main Moscow Construction Administration, the Main Moscow Industrial Building Materials Administration, the Main Moscow Installation and Special Construction Work Administration and the Main Moscow Motor Transport Administration. The main link here is the Main Moscow Construction Administration; it provides the final product--the housing unit. The second and third partners must supply parts, components and materials strictly according to the schedule. The fourth--"Mosstroytrans" Administration in the Main Moscow Motor Transport Administration must deliver all of this to the structures on time and with care.

On time, with care, according to schedule.... This is the way it should be but it is not always achieved by far. To easily become convinced of this one need only acquaint oneself with the kilograms of minutes from dispatchers' meetings, teletype reports and listen to the squall of telephone conversations that have led to the shocking state of affairs among the workers at the ATS [Automated Telephone Exchange].

In the previous article we said that the largest subdivisions in the Main Moscow Construction Administration entered the new year either with a minimum amount of stockpiling or almost without any stockpiling. And complete stockpiling is only half of success. Why has it turned out this way? According to the instructions that are in force as law the schedules for completing the foundation cycles must specify the timely preparation of the site, the erection of the foundations with their "fillings," and the laying out of roads. And also, what is no less important, the new sites must be equipped with complete parts according to a strict technological sequence.

Unfortunately, these are still only good intentions with which, alas, you cannot even pave the access routes to the structures--the construction schedules for the foundation cycles and "boxes" that were approved by the Main Moscow Construction Administration and coordinated with the partners, are poorly observed by plants in the Main Moscow Industrial Building Materials Administration. This is what occurred, for example, at the same Moscow State Housing Construction Association (MGOZhS) during the last quarter of the past year. The "Mosstroytmaterialy" Trust disrupted the delivery of articles for the foundation cycles at 35 sites that the association should have put into operation during the first and second quarters of the current year. Due to this subsequent technological operations were not begun on time. The losses in volumes of work for the association comprised almost 1.5 million rubles and 16,000 man days for the crews.

The failures to completely supply articles for the foundation cycles disrupted the technological processes and thus millions of rubles of articles accumulated in warehouses at the plants and construction sites. Incidentally, builders had settled the accounts for them earlier and therefore took the losses upon themselves. Due to



this, MGOZhS was not able to assemble at the minimum several buildings having an area of 54,000 square meters or they lost almost 4 million rubles of construction and installation work. The practice of delivering "in bulk" in a way creates an abundance of articles at the sites. But it turns out that the articles are in abundance in warehouses at plants and at the sites while the floors go up slowly. In truth there is a reserve supply while taking a loss.

The incompleteness of supplies is one side of the coin. There is another. Workers in just the subdivisions of MGOZhS that erect buildings primarily out of articles from the common catalogue and other organizations in the main administration every now and then draw up formal documents because of the delivery of poor quality articles. During the past year the number of claims in MGOZhS alone was more than 1,080 while the sanctions--fines claimed from the Main Moscow Industrial Building Materials Administration by arbitration--exceeded 700,000 rubles. Even the data selected at random testify to the fact that about 20 percent of the "defects" by the association were engendered by suppliers of defective products. In order to eliminate them tens of thousands of workers are diverted every day in the Main Moscow Construction Administration to eliminate them and the expenditures for this exceeds the sums returned through arbitration by a factor of 1.5.

#### Unprofitable "Trifles"

The third participant in the construction production organizational structure--the Main Moscow Installation and Special Construction Work Administration--is obligated to supply stock metal devices, forms for making articles, tower cranes, complete elevator shaft units, small and large metal components, mortar, concrete and many other things. Formed on the base of the production enterprises administration in the Main Moscow Construction Administration and rising to the rank of a main administration this participant was able to increase the number of management personnel by a factor of 10 (we would note that production capacities increased by only 15 to 20 percent) and began to concern themselves with the needs of housing construction less responsibly.

Examples? They are many. For example, small reinforcing cages without which you won't build a housing unit. Before the UPP [possibly [Moscow] Administration of Industrial Enterprises] manufactured them without a murmur and now the main administration's plants only accept orders from builders for metal components whose total weight is no less than five tons. They willingly manufacture, for example, large expensive strained glass panels. Builders desperately need metal assembly bindings. But you won't find them with a light in broad daylight--plants in the Main Moscow Installation and Special Construction Work Administration and the Main Moscow Industrial Building Materials Administration provide only a small portion of what is needed. It was established that more than 100 types (having legal technological documentation) of zinc coated parts are not manufactured at all at enterprises in the Main Moscow Installation and Special Construction Administration. Builders must ship a portion of the components from elsewhere, even from Latvia.

The main administration willingly accepts outside orders for large sums but repairs tower cranes and excavators slowly. Due to this a great number of mechanisms are not operable. Servicing for many construction and road machines is poorly organized, especially those that "exceed the timetable" for the between repairs cycle--"EO-3322" and "E-5015" excavators, a number of different types of bulldozers, pneumatic presses, compressors, cargo and passenger elevators and hoists. The primary units and assemblies in machines are not accepted for capital repair.

And there is yet another fact--the Main Moscow Construction Administration is responsible for turning over the housing units for use while the Main Moscow Installation and Special Construction Work Administration is responsible for installing the elevators. The former is rigidly "tied" to the timetables for turning over the finished product--housing units--while the latter is not and often disrupts the installation of elevators. Maybe it would be more advantageous to place the "Mosliftmontazh" Trust under the jurisdiction of the Main Moscow Construction Administration.

#### Non-Praiseworthy Diligence

The last corner of the "square" is the Main Moscow Motor Transport Administration, more specifically--it's "Mosstroytrans" Administration whose obligations consist of the timely, steady, legal delivery, according to transportation and installation schedules, of prefabricated components and materials to each structure that is planned to be put into operation. At present the role of motor transport which serves construction, to speak frankly, is still far from this. The subdivisions of "Mosstroytrans," with the exception, perhaps, of Motor Vehicle Combine No 1, is diligently disrupting the timetables for delivering articles and materials. Along with this drivers are not materially interested in delivering small batches of cargo. And so it happens that an ASUS dispatcher dictates: deliver, let's say, 10 articles to a section for the first floor and the driver loads 20 articles at the plant and transports them to the structure, knowing that the construction site does not need half of the cargo.

According to the data of the Main Moscow Construction Administration such a type of "delivery" costs builders hundreds of thousands of hours of lost working time per year. They are multiplied by the fact that round the clock delivery of articles and materials has still not been organized. There are other troubles also--motor transport workers regard the demands of builders with enviable cold bloodedness for specialization in motor vehicles so that they would not only deliver cargo but would help to unload it at the structure. At the same time as the motor vehicle industry that serves the structures, according to reported data, obtains many millions in profit, builders assign about 12,000 workers every day for transferring components and materials.

\* \* \*

In the articles the topic was chiefly about the damages that are born by the Main Moscow Construction Administration, the primary producer of the finished construction product, due to the uncoordinated aspirations of its partners in housing construction--the Main Moscow Industrial Building Materials Administration, the Main Moscow Installation and Special Construction Work Administration and the Main Moscow Motor Transport Administration. One might suppose, reading the articles, that workers in these organizations will object--we have claims against the Main Moscow Construction Administration, also. This would be a reasonable comment. This main administration permits quite a few flaws in organizing labor and planning. These are unregulated and, at times, erroneous schedules and orders for the delivery of articles and materials. It is impossible, alas, to assert that model order reigns at the sites, that three shift work has been precisely organized or that even components that are badly needed

for the building are always ready to be accepted here. It so happens that you will not find construction workers at the structures with a light in the daytime during the second and especially the third shifts; from this comes above normal idle time for motor vehicle transport and other troubles. While complaining about the low quality of certain articles manufactured at plants in the Main Moscow Industrial Materials Administration, construction workers themselves at times permit bad management in their storage and use.

All of this is so. But we are emphasizing the important thing--all those involved in the main administration's urban housing construction production organizational structure must subordinate their organization of labor, economic mechanism, and material incentives toward one goal--to provide the Main Moscow Construction Administration, as well as the Main Moscow Industrial Construction Administration and the Main Moscow Housing Construction Administration--the principal suppliers of the finished construction product--with all that they need completely and on time. As to the claims against the Main Moscow Construction Administration, they should be carefully studied and the main administration should take the necessary measures.

In order to implement the resolutions of the 26th CPSU Congress participants in Moscow housing construction must overcome quite a few traditional deficiencies. It is time to decisively do away with the instability of production programs and with revising them and to assert the equal responsibility of all partners in completing the plan for the final product--the finished building.

A solution to these problems will help all participants in housing construction to substantially increase the return on their labor.

#### Estonian Construction Program

Tallinn SOVETSKAYA ESTONIYA in Russian 27 May 81 p 2

[Article by R. Kvell, chairman of ESSR Gosstroy: "Strictly According to the Limit"]

[Text] During the 10th Five-Year Plan a substantial construction program was realized in the republic: about 3.5 billion rubles of capital investments were utilized and dozens of new structures were turned over. The facts that are generally known illustrate the capabilities of the republic's construction industry, and of architects and designers--all the specialists involved in erecting this or that structure. Something else should also be noted. The past five-year plan has convinced builders that completing tightly scheduled tasks on time is completely realistic. In other words, a unique kind of psychological change occurred in evaluating their strengths and capabilities which will make it possible, we hope, to confidently accomplish the tasks that have been set for builders during the 11th Five-Year Plan.

Several fundamental trends in the construction activity of the preceding period have been indicated in the documents of the 26th CPSU Congress. The main one is putting fixed assets and production capacities into use on time. This in turn makes it incumbent to concentrate material resources and capital investments at especially important structures and keeps funds from being broken up among individual construction sites. Now new structures can be financed only under those conditions where



the client covers all unfinished structures with standard capital investments. These measures should ensure that the volume of unfinished construction is reduced and that the standard construction timetables are observed.

The Basic Directions that were accepted at the 26th Party Congress specify an increase of 12 to 15 percent in planned capital investments and an increase of 15 to 17 percent in labor productivity in construction. The conclusion from this is: the additional utilization of capital investments must be ensured practically by means of growth in labor productivity. Along with this one must take into consideration the fact that the distribution of capital investments among the regions of the country is not identical and that substantial funds are allocated to eastern regions. The volume of construction and installation work in Estonia should increase by approximately one percent in 1981 in comparison with last year. This creates realistic possibilities for completing the construction plans in subsequent years. The most important thing here is that the problems of allocating capital investments for the development of a production base for construction be correctly solved. For example, the volume of products from plants that turn out construction components must be increased by means of improving production efficiency and not by means of increasing the number of workers, and, along with this, by starting not with narrow departmental interests but with the needs of the republic as a whole. In order to speed up the turnover rate of capital investments the amount of equipment that has not been put to use must also be reduced in the future. With this aim it is necessary to already issue drawings during the first year of construction when designing large complex structures and not wait for approval of the design. There is also another way: to issue working drawings in stages for structures with a planned timetable of more than two years.

The role of designers is also great here. I will explain by an example.

As is well known, construction of the Pylva Rayon hospital was finished in December of last year. The work of designers, construction workers, etc. was crowned with success. Medical service in Pylva was substantially improved. In other words, the goal that was set was achieved. But let's scrutinize this carefully: at what price? In the final total the cost of the structure exceeded the planned estimated cost by a half million rubles. Several reasons affected this.

Here is one of them. In the beginning, designers in the "Estkolkhozstroy" Institute decided to make the building's suspended ceiling from ferrous sheet metal. Why not, it is economically advantageous--it is cheaper than ceilings, let's say, from aluminum. The cost of the materials for the planned work was put in the estimate. However, during the course of construction it became clear--a mistake was made. The technology and structural form of the building required precisely aluminum suspended ceilings. And the problem of their delivery would have been solved more easily--one of the Voronezh plants has mastered the serial production of this product. The result was an increase in the price of building the structure (along with several mistakes in the estimates) which "generated" the aforesaid half million rubles. And, as usually happens in such cases, a chain reaction followed: an increase in the estimated cost of one structure knocks the next structure out of the plan--the annual limit is exhausted. The result of this chain reaction is the notorious "incomplete work."



I will name another reason also--often plans for erecting this or that structure are worked out formally without taking into consideration the realistic capabilities of construction organizations. For example, during the past two years construction of the Tallinn health services structure has dragged on. Work over and above that specified had to be done at starting construction sites for the sum of more than four million rubles last year in the republic ministry as a whole, which adversely affected the timetables for erecting other structures.

And, it seems, it is not within the power of Gosbank, Stroybank [Construction Bank] and ESSR Gosstroy to solve this problem here. It is necessary, in our view, to increase the responsibility of ministries, departments, appraisal agencies and design, structural design and scientific research organizations for ensuring that projects are completed by builders on time and on a high technical level and that the estimated cost of construction is determined correctly.

This is even more important since further industrialization of housing construction is scheduled during the 11th Five-Year Plan. In the near future the "Estonproyekt" GPI [Urban Design Institute] will finish working out the structure of housing construction in the republic for the five-year plan and for the period to 1990. Reconstruction of the Tallinn and Tartu DSI [Housing Construction Combine] is already going on, upon the completion of which the combines' capacities will increase to 250,000 and 140,000 square meters of living space annually, respectively. The technical and economic basis for building the first phase of a combine for manufacturing single apartment wooden houses is also being compiled which will begin at the end of the five-year plan. These measures should provide the required level of industrialization for housing construction in the republic.

The CPSU Central Committee's decree "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" is the basic document for realizing the principal directions for the development of the country. The demand for construction plans that are well thought out and completed on time and ensuring a steady pace of work for design and construction organizations is brought to the fore in the first plan. Uninterrupted three-year planning in construction makes it possible for design organizations to operate at a steady pace and to hand over design documentation to the structure before 1 July of the year that precedes the start of construction. This, in turn, disciplines clients since a design that is not completed on time results in its being excluded from the plan for the following year. The availability of designs gives construction organizations the possibility of ordering building materials and components on time, of preparing the construction site for work, etc. This is an important moment if you consider that, beginning with the current year, payment for design work is made by the client only in the case where the project is completely finished and that sanctions in the form of fines are specified for exceeding the timetables for finishing them. All of this is called upon to stimulate the completion of design documentation on time.

What are our immediate tasks? During the course of 1981 it is necessary to complete the adoption of the above mentioned system of accounting for the work completed at the structures.

Much work must be done to transfer to new budget standards and pricing for construction. The prices that now exist for building materials are outmoded and do not correspond to real production expenditures. The development and adoption of new pricing will make it possible to eliminate the disproportions in construction economic accounting and will increase the responsibility of construction organizations for the profitability of production.

Solving these and many other problems will make it possible for designers and builders, by overcoming the existing difficulties, to reach even greater heights during the 11th Five-Year Plan and to increase their mutual responsibility for concentrating every kind of resource for accelerating the completion and start up of those enterprises that, as was noted at the 26th CPSU Congress, "...are capable of providing the greatest growth in production and solving the tight spots."

9495

CSO: 1821/103

## CONSTRUCTION

### LENINGRAD: LAND USE PLANNING

Moscow ARKHITEKTURA SSSR in Russian No 6, Jun 81 (signed to press 5 May 81) pp 5-7

[Article by G. Buldakov, chief architect of Leningrad: "Interaction Between Man and Nature"]

[Text] The problem of interaction between man and nature, its transforming activity and the active effect on the environment are of important practical significance.

Human society is a special part of nature, relatively opposed to the remainder of nature which we understand as the external environment.

During the industrial phase of the evolution of the interaction of society and nature, society is changing from elementary consumption of natural resources to organization of planned natural processes and toward development of natural conditions favorable to man, while the sphere of interaction of nature and society is becoming the formation of the human-organized labor of the natural and historical environment. But this interaction contains an internal contradiction.

Talking about the difference of man from the remainder of the animal world, F. Engels pointed out that an animal only utilizes external nature and makes changes in it simply due to its own presence, while man forces nature by his alterations to serve his goals and dominates it.

But this dominance is relative: "during each step facts remind us that we in no way dominate nature, that all our supremacy over nature consists in the fact that we, unlike all other beings, know how to recognize its laws and to use them properly." (F. Engels, "Dialektika prirody" (The Dialectics of Nature)).

This is also the basis for understanding the relations of human society and the external environment and for determining problems on protection of it during anthropogenic activity, specifically when working out and implementing city-planning measures. Urbanization, being a reflection of significant structural changes in the economy and social life, has an ever-greater effect on the state and shape of the external (ecological) environment and on the internal contents of the artificial environment and its external shape.



Planning Draft of Southwestern Part of Leningrad. Model.

Active and planned architectural-construction and city-building activity to transform the natural external environment should be accomplished on the basis of rational and careful use of natural resources, without which harmonic interaction of



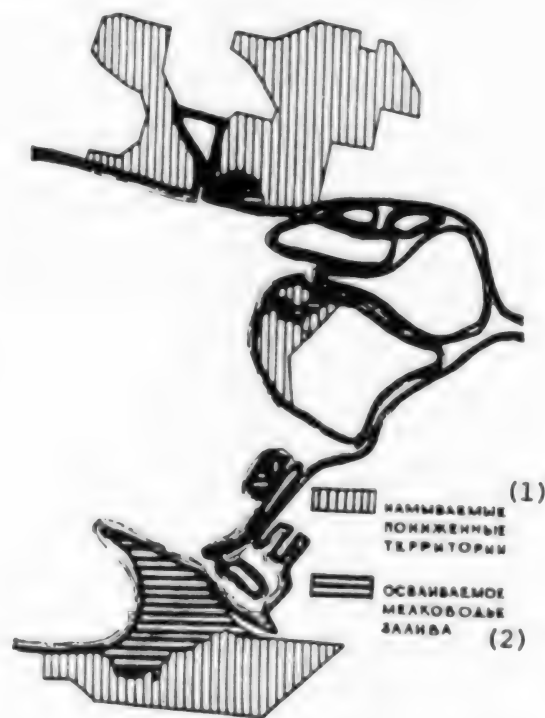
the socioeconomic and ecological systems and an equilibrium between nature and the artificially created external environment cannot be achieved.

Consideration for nature and protection of its resources in our country are one of the constitutional duties of USSR citizens.

At the same time, the territorial disposition of productive forces and settlement and the high rates of urbanization reflect the progressive anthropogenic alteration of the environment. The desire to conserve nature everywhere and in its initial form at any price and to conserve the ecological environment as a whole contradicts fundamental problems of economic and social progress.

A city, due to the fact of its existence and development, contradicts the external environment and in some cases conflicting situations arise since formation of an urban environment always proceeds at the expense of the natural external environment.

The main problem of town-building is to develop the most feasible optimum measures of rational solution of problems generated by opposition between anthropogenic and the natural environments.



Developing the Maritime Regions

Key:

1. Silt-laden submerged areas
2. Shallow water area of bay that can be developed

The main goal in the use and transformation of nature is to optimize the living conditions and economic activity of society.

The role of the architect in determining the forms and limits of action on nature to create an artificial external environment and in direct use of nature itself for the good of man is exceptionally great.

His activity, which reflects the results of the forward development of the capabilities and needs of society, should be reduced to a harmonious combination of architecture with nature and efficient use of natural factors in the interests of mankind.

Regulating the growth of a city, forming a rational system of settlement and location of mass recreation zones, transforming the planned structure of previously constructed, historically established regions and industrial zones, development of a transportation system with regard to reducing its harmful effect on the environment and a number of other factors are the basic directions in the work of town-builders.

The entire history of Petersburg-Leningrad is a chain of town-building decisions and architectural-construction measures directed toward "regulation" of the contradictions between the natural and anthropogenic environment. If one analyzes the character of the artificial effect on nature during formation of Leningrad, one can note both its positive and negative aspects.

The former include skilled use of the natural environment during formation of the city, harmonious unity of its architectural and natural landscape, development of the main compositional axis of the city on the banks of the Neva River--a system of interrelated architectural groups, the enormous volume of work to drain and reclaim the territory of the city and its environs and creation of a considerable number of reservoirs and park and forest-park tracts around the city.

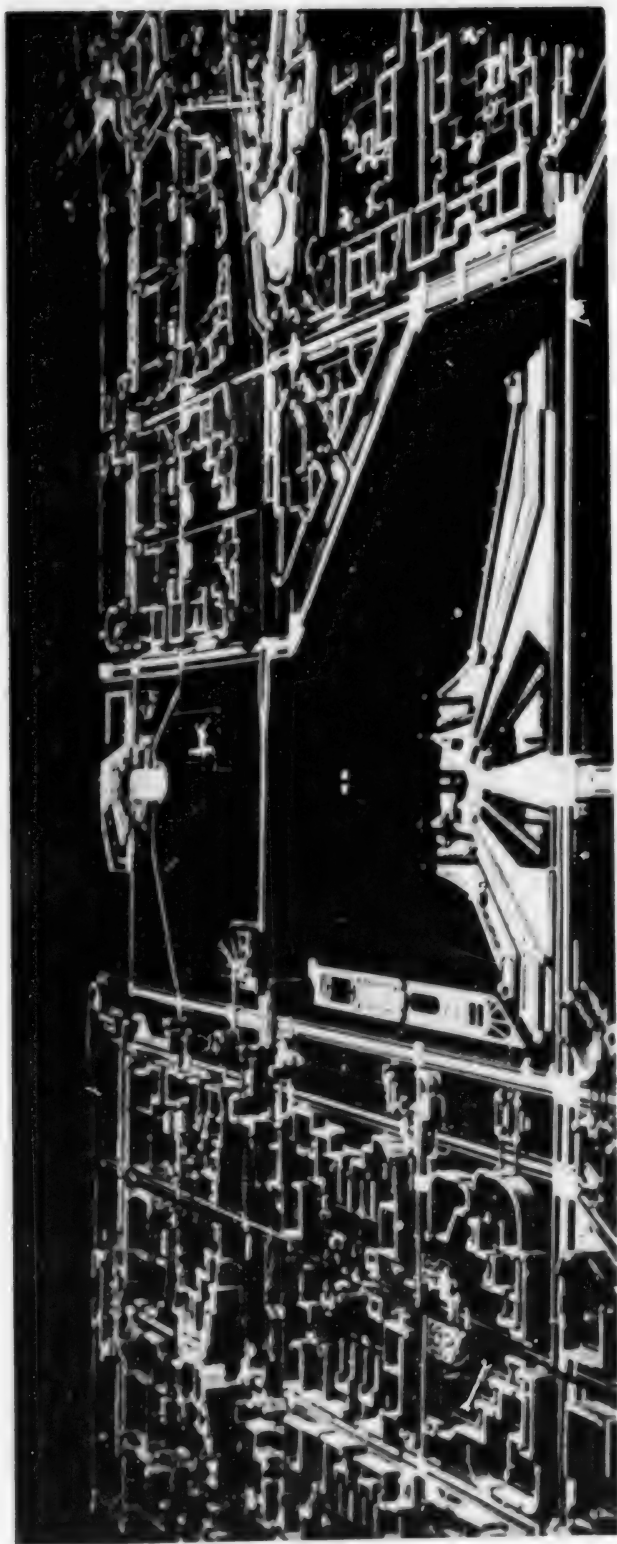
The negative aspect is the isolation of Leningrad, despite its maritime location, from the sea, formation of a large industrial center inside the city, the highest maximum construction density in the central part of the city, pollution of the soil, air and water basins, destruction of a considerable number of forests surrounding the city toward the beginning of the 20th century and a number of others.

The contradictions between the natural and anthropogenic environment are aggravated under specific conditions during development of a large industrial city. However, opportunities are created in a socialist society for planned solution of timely problems of environmental protection and usage and formation of a comfortable habitation.

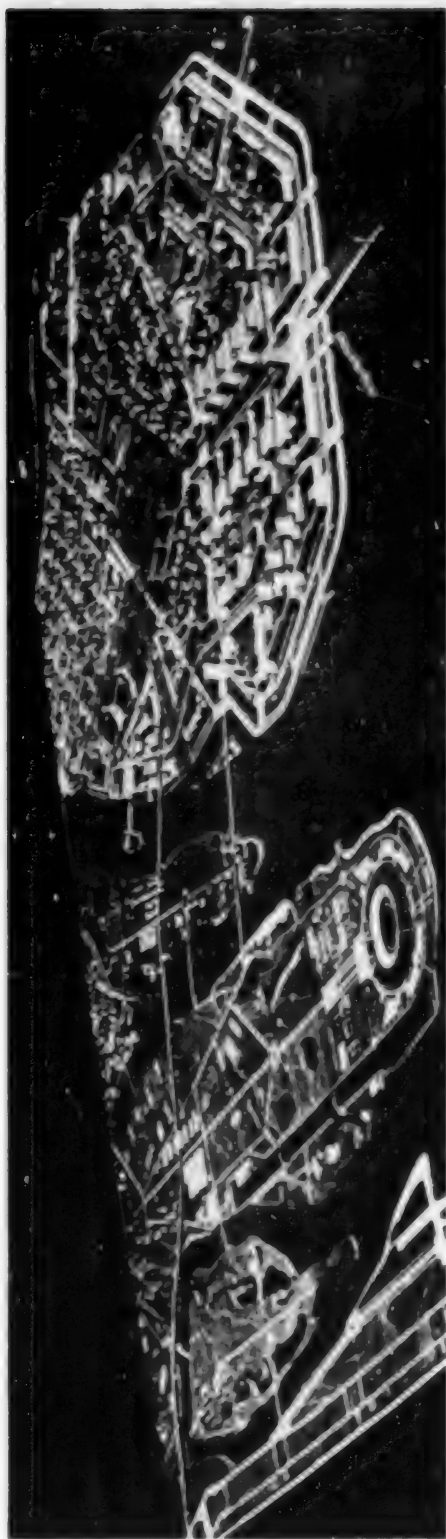
There were always and will be contradictions between nature and the urban environment. Deviations from the norms that constantly arise during development of a city should be resolved properly.

The surrounding environment created by man should be well designed, which places great responsibility on architects-town builders.

Overcoming some natural deficiencies of nature within the possible and also planning and construction deficiencies historically established as a result of prolonged development of a city is one of the main tasks of the confirmed general plan for development of Leningrad which specifically provides for formation of a forest-park



Planning Draft of Northwestern Part of Leningrad. Model.



Detailed Planning Draft of Vasil'yevskiy Ostrov



belt around the city, organization of a broad exit of residential areas to the coastal area of the Gulf of Finland, protection of Leningrad and its adjacent areas against intensive flooding, a significant increase of planted areas within the city and restoration of the quality of the air and water basins, stopping soil pollution, conserving the valuable qualities of the architectural and artistic face of the city, especially its central part, and preservation of architectural monuments and also dispersion of the historically established construction of central regions of the city, bringing order to planning and reconstruction of the industrial belt, efficient use of the underground space of the city and so on.

The problems of an outlet of the city to the sea and protection of it against intensive flooding are a specific feature of Leningrad.

An outlet of the city to the sea is related to enormous volumes of hydraulic engineering work in engineering preparation of areas for new construction, as a result of which the contour of the shoreline of the Neva Bay of the Gulf of Finland will be considerably altered and all the swampy areas within the city boundary will be eliminated. A problem of primary town-building importance will be solved--the sea facade of Leningrad will be shaped and healthy and comfortable conditions for the populace will be created by active transformation of the natural environment.

This task is already being fulfilled successfully. An area of approximately 5,000 hectares, including 900 hectares of territory reclaimed from the sea, can be used as a result of total completion of silt-control work.

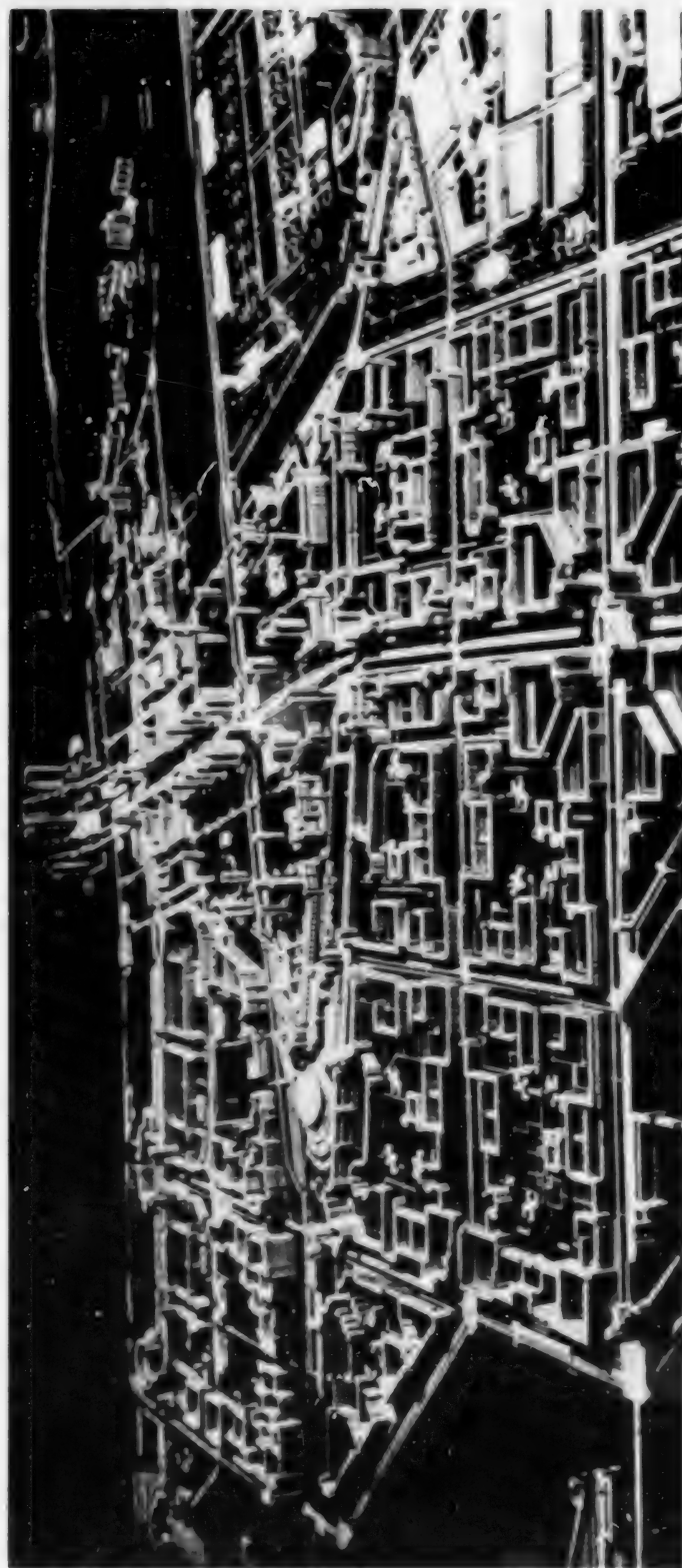
The task faced by our generation of architects has no analog in scales and scope of the planned work in the practice of domestic town-building.

Leningrad is subjected to periodically repeating floods that inflict material losses on the city. These floods occur as a result of the complex interaction of meteorological and hydrological processes occurring in the Baltic Sea and the Gulf of Finland. Construction of facilities to protect Leningrad against flooding has begun, which will be completed in 1990. The protective structures are a complicated engineering and hydraulic engineering system. Their basis is a levee 25.4 kilometers long that intersects the Gulf of Finland in the Gorskiy-Ostrov Kotlin-Lomonosov alignment.

Two ship archways 200 and 110 meters wide and water passages are provided in the levee. When the water rises, steel gates close the ship and water passages within 30 minutes. A multilane highway with bridges over the water passages and tunnels under the ship passages passes along the top of the levee. The highway will be of important significance to Leningrad, easing the load on main urban thoroughfares.

An internal water basin approximately 400 km<sup>2</sup> in area, cut off from the Gulf of Finland by the levee, will take on the entire runoff of the Neva River during flooding without danger of flooding the city.

One of the most important problems in construction of protective facilities is alteration of the ecological environment. A large-scale working model of Neva Bay has been constructed for this purpose and a number of possible experiments,

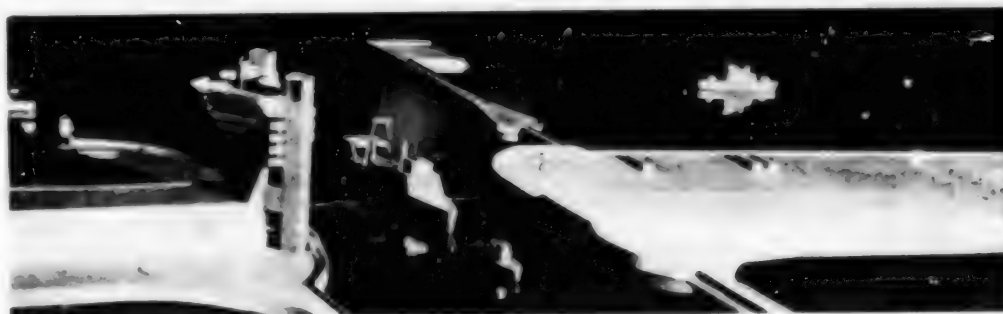


Planning Layout of Northwestern Part of Leningrad. Residential Rayon Lakhta. Model.

fundamental improvement of its qualitative characteristics.

These large town-building measures are being worked out with the participation of a number of planning and scientific research institutes and specialists of different profile, but the leading role in this complex work still belongs to the architect-town builder.

One of the promising directions for solving the complex and universal problems with a shortage of free urban areas is the use of the city's underground space, which is also active interference in the natural environment.



River Gates. Model

Planned organization and development of the underground space of Leningrad has the purpose of increasing the efficiency of utilizing the urban territory, restoring the urban environment by reducing noise and the level of atmospheric pollution by exhaust gases, freeing the land surface of transient traffic of urban transport and also location of some trade-service and transport facilities in the underground space, especially in the zone of development of the general city center. All this will contribute to creation of favorable conditions for the life and activity of the urban population, protection of architectural monuments and conservation of the historically established face of the central regions of the city as a whole.

The vigorous rates of urbanization comprise one of the typical features of the modern era.

Urbanization will determine to an even greater degree the nature and shape of the living environment in spatial expression during further development of society.

Cities are laid out under the strong influence of natural conditions but their formation has an active effect on the complex of nature, transforming it to one or another degree in the interests of man.

The architect-town builder, directing his urbanization activity toward creation of a favorable artificial living environment, should strive toward interaction of it with nature that provides an ecological equilibrium. This important mission requires extensive knowledge, professional skill, rich experience and turnover of all creative forces of town builders to the matter of creating favorable conditions for the life of people, their creative labor and healthy and cultural recreation.

COPYRIGHT: Stroyizdat, 1981

6521

CSO: 1821/104



## CONSTRUCTION

### KAZAKH SSR CONSTRUCTION ORGANIZATION EFFICIENCY ANALYZED BY MISI NIIOUS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR. SERIYA OBSHCHESTVENNYKH NAUK in Russian No 3, May-Jun 81 (signed to press 18 Jun 81) pp 54-61

[Article by R. M. Merkin and O. M. Beysenov: "Pressing Problems of the Construction Economy"]

[Text] The development of aspects of analyzing the activity of construction organizations which have become fixtures in the scientific literature and revealing patterns and ties which have long remained in the shadows, outside the sphere of analysis, are of essential importance in understanding phenomena occurring in the sphere of capital construction and construction production.

Analysis of planning practice testifies to the fact, given a substantial increase in the work program of construction organizations, and also given a reduction in it as compared with the level previously achieved, the economic and other consequences associated with the change-over of construction organizations are not being taken into account. In precisely the same way, full consideration has thus far not been given to structural shifts, and indicators of construction duration and labor productivity, quality and net cost, the use of fixed assets and live labor, and a number of others, are being planned in isolation.

The change-over to an intensive path of capital construction development and actualization of 25th and 26th CPSU Congress assignments on substantially reducing construction duration and improving its quality, in combination with the ever-intensifying unevenness in distributing the capital construction program across the country, have led to the objective necessity of taking a number of factors which have long been ignored into account in our planning. They include unevenness in planning the loads on construction organizations and the resulting consequences, change in the degree to which production capacities of construction organizations are bound to construction programs already begun, the influence of construction duration reduction assignments on the technical-economic indicators of construction organization activity, change in the proportion of the start-up program and its impact on the technical-economic indicators of construction organization activity.

In this article, we will use Kazakh SSR construction organizations to reveal certain new dependences and ties whose study is of important significance to planning and analyzing the activity of construction organizations.

1. Analysis of features of planning the contractor work programs of construction organizations of the KaSSR Ministry of Construction of Heavy Industry Enterprises

(as of the country as a whole) testifies to an ever-increasing unevenness in the load on general construction organizations.

A study of data for 36 organizations of the republic Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] shows an increase in the number of instances of change in the refined general contractor work plan relative to actual work volume performed the preceding year. Thus, whereas nine of the 36 organizations (25 percent) planned a decrease in work volume in 1972 as compared with the preceding year, there were 15 such organizations (41.7 percent of the total number) in 1978.

Particular attention should be paid to revealing patterns of change in the technical-economic indicators of contractor organizations when their work program has been decreased as compared with the level previously achieved.

The fact is that the change-over to intensive forms of economic development has been accompanied as well by a certain reduction in the rates of growth in capital investments and construction-installation work for the country's national economy as a whole. In the long run, this trend will intensify, which, in combination with uneven distribution of the work program by territory, will lead to a significant increase in unevenness in the planned load on construction-installation organizations. What influence will reducing a contractor work program as compared with the preceding period have on the technical-economic indicators of construction organization activity?

To this end, the NIIOUS [not further identified] of the MISI [Moscow Institute of Construction Engineering imeni V. V. Kuybyshev] has made calculations based on construction organization activity data for a number of years, enabling us to reveal a rather close connection between change in the work program and change in labor productivity, total profit and net cost of construction-installation work.

During 1971-1978, the general contractor work program decreased as compared with the level actually achieved in the preceding year in 71 of 278 instances (25.5 percent); the plan for work done by one's own efforts (based on a refined plan) was lower in 63 instances (22.7 percent). In 54 of 63 instances (85.7 percent), the own-efforts contractor work plan adjusted at the end of the year was lower than the level previously achieved and the work volume actually done by these organizations had also decreased. In this regard, labor productivity decreased in 28 of 54 instances, total profit decreased in 29, and in 31 instances the net cost of construction-installation work increased.

Some idea of the size of these reductions and the closeness of the bond between planned changes in contractor work programs and changes in technical-economic parameters is provided by the calculations given in Table 1 (following page).

Consistent, successful implementation of the contractor work program is largely associated with prompt preparation of the material-production base of construction.

Given a planned economy, the five-year plans are a reliable basis for the advance preparation of construction organizations for carrying out a changing work program. At the same time, it must be noted that in 1971-1978, the annual plan assignments corresponded to the five-year plan assignments in only 92 of 278 instances for the 36 construction organizations of the KaSSR, that is, somewhat more than 25 percent (the

relationship holds if the ratio of annual plan assignments to five-year plan assignments does not exceed  $\pm 3$  percent).

Table 1.

indicators

amount of change (in percent of preceding year) by group of organizations whose work program has decreased by:

	0-3%	3-7%	7-15%	15-30%	total
own-effort contractor work plan as compared with actual amount of work done by one's own efforts	1.8	4.9	10.5	20.7	8.4
actual amount of work done	3.9	7.1	6.8	10.0	6.7
labor productivity	4.0	7.4	4.6	5.2	5.4
total profit	58.7	74.4	77.7	80.6	73.9

Annual plan deviation from five-year plan assignments (for the corresponding years) is shown in Table 2.

Table 2.

amount of deviation, in percent	general contractor		own efforts	
	number of instances	percent	number of instances	percent
$\pm$ up to 3	92	33.0	62	22.4
$\pm$ 3-7	61	22.0	55	19.8
$\pm$ 7-15	50	18.0	69	24.8
$\pm$ over 15	75	27.0	92	33.0
total	278	100	278	100

These calculations testify to the fact that, when the annual plans deviate minimally from the assignments outlined in the corresponding year of the five-year plan, the established plans are carried out at a higher level.

II. One of the little-understood problems in the scientific literature and in practice is the nature of the connection between a planned reduction in the duration of the construction cycle with national economic expenditures objectively necessary for this purpose, including construction organization outlays. This is one of the most-discussed problems and one on whose correct solution the interest of construction organizations and other participants in capital construction (equipment suppliers, construction component manufacturers, planning organizations) in substantially reducing the duration of the construction cycle as a whole largely depends.

A number of specialists (Professor P.D. Podshivalenko and several others) totally reject the justifiability of any additional expenditures connected with reducing average construction duration.<sup>1</sup>

Individual economists (N.S. Sachko, for example) allow the justification for recording only additional capital (one-time) expenditures associated with developing construction organization capacities to a normative level.<sup>2</sup>

1. Podshivalenko, P.D., "Task of Reducing Construction Time," VOPROSY EKONOMIKI, No 3, 1973.
2. Sachko, N.S., "Faktor vremeni v sovetskoy ekonomike" [The Time Factor in the Soviet Economy], Moscow, 1967, pp 193-197.

We must not fail to examine the important inaccuracies permitted by P. D. Podshivalenko in presenting this problem. He asserts that opponents of his position consider it necessary to compensate construction organizations for all actual expenditures or any expenditures which are substantiated by the construction organization for ensuring the prescribed reduction in construction duration. That is not so, however. The proposal is for full compensation only for those socially normal (that is, recognized by society as permissible) expenditures necessary to reduce the construction cycle and, above that amount, to place at the disposal of each participant additional funds which are, strictly speaking, bonuses for reducing construction duration.<sup>1</sup> It is precisely an awareness of the size of these expenditures that permits planning them as a function of the prescribed reduction in average construction duration.

MISI imeni V. V. Kuybyshev's NII OUS has calculated the comparative effectiveness of several branch development variants which differ in level of capital intensiveness and current expenditures in construction, as well as the average duration of construction. These variant calculations have enabled us to determine the permissible increase in national economic expenditures to provide for construction cycles of different duration. P. D. Podshivalenko's interpretation of these variant calculations as a forecast ("net cost will exceed three percent") is incorrect.

The basic argument of specialists who think a reduction in actual construction duration to a normative level at the present stage will not require additional capital and current expenditures is based on two premises.

First. Inasmuch as current actual construction duration exceeds the normative, bringing these times into line with the norm must also be accompanied by a reduction in net cost by reducing the hypothetically constant portion of general overheads. This proposition is sound only if the approved construction duration norms have been optimized in terms of cost. Then normative duration is optimum for construction organizations in terms of outlays, and approximating the norm will actually promise a reduction in outlays also. In actuality, the approved duration norms are not optimized in terms of cost, which has been repeatedly noted (by V. B. Toybis, I. K. Komarov and others), and this is admitted by the developers of the norms themselves. In this connection, the assertion that bringing actual construction duration closer to the normative will not require additional expenditures at the present stage and will lead to a saving in current expenditures is not substantiated by the calculations.

The second premise is that the problem is being viewed for the country as a whole, "in general," divorced from the concrete planning situations which have actually evolved in contractor organizations.

In different construction organizations, the coherence of production capacity and the construction programs already in the implementation stage dissolves considerably, which can be traced in differences concerning the carry-over estimated cost of construction-installation work by construction site and project included in the plan and the average yearly volume of construction-installation work being done by the corresponding construction organization.

Based on a differentiation of this indicator for 21 construction organizations of the KaSSR, we can delineate three groups. In the first group of construction organizations,

---

1. Merkin, R. M., "Ekonomicheskiye problemy sokrashcheniya prodolzhitel'nosti stroitel'stva" [Economic Problems of Reducing Construction Duration], Moscow, 1978, p 151.



a situation has evolved in which the coherence of the production program is 1÷1.5 years (0.2 year for the Alma-Ata DSK [house-building combine], 1.2 years for Dzhambulstroy trust and 1.6 years for Kustanaytyzhstroy trust).

Analysis of the production program structure of this group of organizations testifies to the fact that the proportion of housing construction and relatively small production, municipal-services, cultural and personal-services projects is high in them. These trusts are relatively free to control construction schedules, as their program is not burdened with carry-over projects with high carry-over estimated cost. Reducing average construction duration for this group of organizations requires minimal expenditures, although it is to the point to recall that a significant (30-40 percent) reduction in average construction duration occurred for the Alma-Ata DSK only after completion of expensive renovation of that combine.

In the second group of construction organizations, the average carry-over period for completing programs begun was 2.91 years, fluctuating from 2.1 years for Karagandazhilstroy trust to 3.7 years for the Dzhambulkhimstroy and Tselinogradtyzhstroy trusts. In principle, the ratio of estimate cost carry-overs to average annual volume of work done by these organizations corresponds roughly to the state of affairs in construction organizations of the USSR as a whole. Inasmuch as average construction duration in these organizations generally exceeds 50-60 percent of the normative, one of the most important tasks for this group of organizations is to limit new construction in order to get their planned and actual construction schedules closer to the normatives in the near future. In an actual economic situation, in order to get actual construction duration closer to the normative we need to develop the production capacity of construction organizations, which requires additional expenditures, as the availability of capital to many of these organizations is thus far by no means normative.

For example, the average annual cost of fixed production assets for construction (including transport and construction mechanization) for Yermakferrosplavstroy trust was 380,000 rubles per million rubles in construction-installation work, given a normative availability of capital<sup>1</sup> (based on USSR Gosstroy NIIES [Scientific Research Institute of Construction Economics] norms) of 450,000 to 500,000 rubles; for Petropavlovskstroy trust, the figures were 400,000 and 480,000 to 520,000 rubles, respectively.

For the third group of construction organizations, average carry-over construction duration was 7.44 years.

The only way to normalize construction duration for this group of construction organizations is connected with substantial development of their capacities and with suspending the construction of individual projects with a low percentage of technical readiness. Reducing construction duration for this group of organizations will be associated with the highest expenditures, inasmuch as developing capacity requires additional capital investments of 0.36÷0.4 million rubles per million rubles of increment in capacity. But temporarily shutting down construction leads to freezing capital investments already made in projects begun, calculating a minimum of 0.08

---

1. "Perspektivnyye pokazateli kapital'nykh vlozheniy po formam vosproizvodstva i tekhnologicheskoy structure dlya 1981-1985 gg." [Promising Capital Investment Indicators, By Form of Reproduction and Technological Structure, for 1981-1985], USSR NIIES, Moscow, 1977.

million rubles per million rubles in the current year<sup>1</sup> plus certain one-time expenditures on shutting down and reopening construction.

If correctly done, such calculations provide an objective picture of the planning situation which has evolved in the preplanning period and which must be taken into account when shaping the long-range capital construction plan.

The basic methods requirements when using the calculation system presented above reduce to the following:

a) the estimated cost and carry-over estimated cost must take into account only those construction lines and start-up complexes to be built in the next 4-5 years. Otherwise, the carry-over estimated cost can artificially be burdened by projects which need not be built in the years just ahead;

b) with a view towards obtaining more reliable indicators, it is recommended that data on carry-over estimated cost and data on volume of construction-installation work done be for a couple of years, not just one;

c) in long-range calculation, it is economically justified to use data not on amounts of work actually done by each construction organization, but on potentially possible amounts of work. To do this, we can either refer to the long-range plans for developing production capacities at the corresponding construction organization (when they are available) or adjust work volume actually performed with consideration of the level of production capacity use (that is, with consideration of improvement in the use of construction equipment, eliminating unsubstantiated losses of working time and organizational-technical measures);

d) productive analysis also assumes a comparison of the calculated values of full and carry-over construction duration with the normative and planned values of that indicator, determined with consideration of the structure of projects under construction in a specific construction organization.

In order to do this, we need to set up continuous recording of construction duration for all projects under construction (and not only those put into operation).

III. Steps being taken by the party and government are aimed at further concentrating capital investments, reducing the amount of new construction and preventing the scattering of resources among numerous projects and construction sites. CPSU Central Committee General Secretary L. I. Brezhnev said in the CPSU Central Committee Accountability Report to the 26th Party Congress that "the new five-year plan will be a major test for builders. One characteristic feature will be concentration of efforts in every way possible on the fastest possible completion and start-up of those enterprises which are capable of ensuring the greatest increment in output, of opening up bottlenecks. We have already begun on this course and must keep to it unswervingly."<sup>2</sup> Thus far, indicators of construction concentration have not been reflected either in statistical reporting or in the development of draft five-year and annual plans for contractor organizations. In principle, the level of construction concentration can be described by the average work volume per construction site, the average work volume done at one project, and the average distance between construction sites.

- 
1. "Standard Methods for Determining Capital Investment Effectiveness, Approved By the USSR Gosplan and USSR Gosstroy," *EKONOMICHESKAYA GAZETA*, No 2, 1981.
  2. "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, 1981, p 39.

The amount of work done (and the planned work volume) calculated per site fluctuates substantially for various organizations in different years: for Almaatapromspetsstroy trust, for example, it increased 58 percent in 1978, while for Almaatapromstroy trust it decreased 24 percent that same year.

However, this circumstance has not been taken into account either in planning net cost or in planning fire-patrol expenditures or in planning labor productivity, which is clearly wrong.

IV. Change in the size and proportion of the start-up program in the overall program of construction organization work exerts a definite influence on the dynamics of construction organization technical and economic indicators.

In order to reveal certain general tendencies of change in the proportion of the start-up program over time, dynamic calculations were made by year of the period under review. Table 3 shows how the relationship of start-up program to overall contractor work volume changed from 1971 through 1978 for the aggregate of construction organizations being examined, in percent.

Table 3.

trust	1971	1972	1973	1974	1975	1976	1977	1978
all 36 trusts	45.3	51.8	51.9	53.5	47.1	46.7	46.1	47.1
of these:								
Mirgalimsaysvinetsstroy	20.0	20.9	4.3	23.6	5.0	0	7.8	6.8
Shchuchinskukurortstroy	25.7	20.6	12.5	8.5	26.2	37.4	55.7	60.8
Kazasbeststroy	22.5	17.4	54.4	52.3	36.9	26.1	47.8	43.2
Karataukhimstroy	34.6	18.7	10.3	24.0	39.2	58.1	12.8	11.1
Lisakovskrudstroy	56.8	61.6	60.0	50.5	48.4	48.7	48.4	28.9
Aktyubstroy	55.0	49.6	34.7	79.0	41.7	34.0	68.4	31.3
Pavlodarpromstroy	58.5	62.9	49.3	60.2	58.2	55.2	65.3	83.3

Analysis of the data permits the following two conclusions: first, in connection with the measures adopted in the last five-year plan to concentrate capital investments and improve planning, the proportion of the start-up program in the programs of the organizations surveyed grew steadily during 1971-1974 (from 45.3 percent in 1971 to 53.5 percent in 1974). A trend towards a slight reduction in this indicator was then noted, stabilizing at the 46-47 percent level in 1975-1978.

Second, the unevenness of the construction process at individual projects, in combination with the differing levels and degrees of preparedness of construction stocks, has led to a situation in which the proportion of the start-up program in construction organizations has fluctuated substantially from year to year. In particular, substantial fluctuations were revealed in the proportion of construction-installation work done at start-up projects in the program of contractor work for individual construction organizations. In 21.3 percent of all organizations, the share of the start-up program in the total work volume was 30 percent or less, in 31.3 percent of all organizations -- 31-50 percent of the total volume, in 34.1 percent -- 51-70 percent, and in 13.3 percent -- upwards of 70 percent.

It would be of interest to single out the extreme values for this indicator: the proportion of start-up work in Mirgalimsaysvinetsstroy trust in 1975 was five percent,

and in 1976 -- 0 percent. At the same time, it was 60.2 percent in Pavlodarpromstroy trust in 1974 and 83 percent in 1978.

What influence does this trend have on change in the basic technical and economic indicators of construction organization activity?

In the course of our analysis, we checked the proposition previously expressed that changes in the absolute amounts and proportions of the start-up program in the overall volume of construction-installation work influence a number of technical-economic indicators of construction organization activity. In order to check on how the proportion of the start-up program and change in it affect the level of labor resources use (labor productivity), we surveyed two groups of experts (planning workers and construction organization leaders) by questionnaire and assembled reporting information for 115 construction-installation trusts of the USSR Mintyazhstroy.

An overwhelming majority of the experts in the first group thought that raising the proportion of the start-up program has the effect of lowering labor productivity growth. At the same time, 60 to 74 percent of the experts in the second group noted that increasing the proportion of work done on start-up projects is a supplemental factor in labor productivity growth.

Summary calculations of the information received from the 115 construction organizations showed that in 1971-1976, labor productivity per worker employed in construction-installation jobs and in subsidiary production at start-up projects was 89.9 to 96.6 percent of that of workers at other projects.

Of the total of 115 trusts, the level of labor productivity was higher in absolute terms at start-up projects for 32 organizations (28 percent), but it was lower for 83 trusts (72 percent) than for the corresponding organization as a whole in the period under review.

Both the absolute level and the dynamics of labor productivity growth differed at start-up and other projects. Whereas labor productivity had increased 21 percent in 1976 as compared with 1971 for the surveyed group as a whole, it had increased 19 percent at start-up projects and 23.4 percent at other projects.

In view of this, the conclusion can be drawn that, given current methods of organizing the construction of start-up projects, the output per worker at start-up projects calculated in the traditional cost measurements is lower than at other projects. Moreover, an increase in the proportion of the start-up program in the overall work program of construction organizations tends to depress labor productivity growth. This also signifies that change in the ratio of start-up to other construction must be taken into account when planning labor productivity growth for construction organizations.

An unambiguous answer cannot, of course, be given within the framework of this article to all the questions it touches on.

The basic idea behind the research was to prove the necessity of recording a number of factors having an increasing influence on construction organization economics but as yet not being considered entirely adequately when planning and analyzing construction organization activity. This is necessary both to ensure integrated cost-



accounting interrelationships among all participants in the investment process and for more objective planning of the technical-economic indicators of construction organization operation.

COPYRIGHT: Izdatel'stvo "Nauka" Kazakhskoy SSR, 1981

11052

CSO: 1821/113

## CONSTRUCTION

### AUTOMATED MANAGEMENT SYSTEM FOR CONSTRUCTION UNITS

Moscow KRASNAYA ZVEZDA in Russian 13 May 81 p 2

[Article by Engr-Maj N. Vetelkin, deputy commander of Order of Lenin Leningrad Military District for construction and billeting: "The Main Indicator"]

[Text] At the 26th CPSU Congress, serious attention was devoted to questions of production and, in particular, to raising the productivity of labor as the main indicator of all our efforts and our entire attitude toward matters.

In following the party's call--to perform shock work and to work in the Leninist manner, the Leningrad military builders coped with their planned assignments of last year and of the Tenth Five-Year Plan as a whole.

Accomplishment of the plans was achieved primarily through an increase in the productivity of labor and without increasing the number of workers. We were to increase the productivity of labor during the five-year plan by 16.8 percent, and the actual growth was 20.3 percent. The collectives led by Comrades V. Semenov, I. Klimov, B. Rusinov, A. Grishpun, I. Yakovenko, and others worked with great return.

It is no secret that along with the leaders we have collectives which have not coped with the assigned tasks and permitted a reduction of the previously attained commodity output. It means that not all reserves have been exhausted; it means that individual elements of the economic mechanism idled in places.

Just how can the effectiveness of construction be increased in the Eleventh Five-Year Plan? In recent years, we increased the rates and volume of construction through reserves which, figuratively speaking, lay on the surface. That is, through the military builders' overaccomplishment of the output norms, an increase in modular construction, and several other sources. But today we face the task of looking for new reserves.

Therefore, now we must move to the foreground such directions in the growth in labor productivity as improving the organization of construction, the broad introduction of standard sets of tools, equipment, and small-scale mechanization, raising the degree of plant readiness of articles, and others. In the plan for the technical development and rise in the effectiveness of capital construction for the new five-year plan we envisage the more complete utilization of literally all, even insignificant, reserves for the growth in labor productivity.

In the chain of this complex work an important link is ensuring the uninterrupted work of the brigades. Today, elimination of their idling is one of the most significant reserves in raising the productivity of labor. This is obvious and has been clear to all for a long time. But idling continues to remain the scourge of many construction jobs. As experience shows, its elimination is possible thanks to the clear balancing of the plan with material resources and the use of an automated construction management system (ASUS).

The builders of the district have already attained several successes in the matter of introducing ASUS into production practice. Written requests for required resources to accomplish the work plan of organizations have now been completely eliminated at all levels. The plans for making up sets of materials are developed on the basis of calculations obtained on a computer and construction and assembly work which is balanced with the plan.

Such a system opens a real path toward the mass introduction of big brigades at construction jobs. We are placing great hopes on the ASUS. In the current five-year plan we will automate the development of plans for a 10-day period, month, and quarter for all production collectives and are conducting further improvement of systems for planning material resources and the development of complete production and technical sets. We are also preparing for the automation and centralization of accounting. Much has already been done in this field by our young specialists V. Lilyakevich, N. Gaydash, and others. The annual impact from the automation of management processes is reaching 300,000 rubles and the productivity of labor at the district's construction jobs is increasing simultaneously.

The brigade contract remains an important direction in raising the effectiveness of construction production. The number of our brigades which are operating in accordance with the Zlobinskiy method more than doubled during the last five-year plan. Good experience in organizing a brigade contract has been accumulated in the UNR [work supervisor's section] which is led by Engineer-Lieutenant Colonel V. Brius. The labor indices are especially high here in the brigade which is led by worker of the Soviet Army A. Timashkov. Each month, this harmonious collective accomplishes the planned assignments by 130-140 percent with good quality. In summing up the results of the work the brigade council, after a thorough discussion of the labor and discipline of the workers and military builders, adopts a decision as to which coefficient of labor participation should be employed for each of them. This requires each brigade member to look at his labor self-critically and stimulates him to be the equal of the leaders. We are also keeping to the course of popularizing the brigade contract in the new five-year plan.

The progressive job-contract-plus bonus system of wages which permits combining the interests of the state with the personal interest of the construction job workers is finding broad application in the district's construction organizations.

Many unused reserves remained in the matter of introducing the continuous mechanization of work and the use of construction equipment at the construction jobs. The trouble is that machines which are located directly at the sites frequently stand idle sometimes because of breakdowns and sometimes due to the lack of work for them. In 1980, many collectives did not accomplish the plan for combined mechanization of plastering and painting work and means for small-scale mechanization were poorly introduced: floating and plastering machines, mortar pumps, and

highly-productive painting assemblies. The technical-engineering personnel and, first of all, the chief machine operators of the UNR, nevertheless are insufficiently engaged in the introduction of small-scale mechanization and a reduction in expenditures of manual labor.

In looking for production reserves, the builders of the district will conduct further improvement of the technology for construction and assembly work in the Eleventh Five-Year Plan on the basis of the use of progressive construction machines.

But our alarm is caused by the condition of the fleet of construction machinery which virtually has been unrenovated in recent years. We will be unable to correct this situation without the guidance of Glavvoenstroy [Main Directorate of Military Construction].

Much in the matter of raising the effectiveness of construction also depends on the plan employed. Economical construction decisions which would exclude labor-intensive processes, reduce the materials intensity of structural elements, and raise the modular nature of construction originate namely with the planners. In the Tenth Five-Year Plan Voenproyekt [Military Planning Directorate] jointly with the builders worked out plans for completely pre-fabricated structures with walls of claydite-concrete panels which are produced by the plant for ferroconcrete articles. Plans have been produced for completely pre-fabricated barracks, garages, boiler houses, cleaning structures, and reservoirs. The use of these plans reduced the construction times and reduced the labor intensity of the work. In five years, our level of industrialization was increased from 29 to 37 percent.

But, unfortunately, in the Eleventh Five-Year Plan the development of completely pre-fabricated construction will not proceed at such high rates in the district. And the main brake is that the equipment of the plant for ferroconcrete articles is obsolete and does not permit mastering new progressive structural elements in the required volumes. The radical renovation of the plant is impossible for city design and building considerations since its territory proved to be in the areas of the mass development of Leningrad. We are looking for a way out in that we are planning a reduction in labor expenditures through the introduction of progressive structural elements and articles.

This is first of all the broad employment of large-panel gypsum-concrete dividing walls. In 1982, our own shop will be put into operation for the production of gypsum-concrete dividing walls for residential houses and other buildings. We have begun to employ pre-fabricated and gypsum-concrete sanitary-technical cabins having complete plant readiness. If we see that these cabins are used in all brick houses, the saving in labor expenditures will be 5,000 man-days.

In the new five-year plan, we have the possibility to reduce the labor intensity of finishing work, including through its industrialization. And the substructures beneath the floors will be 80-90 percent made of finished slabs for the entire room with the subsequent gluing of linoleum floor covering. Pre-fabricated window jambs of gypsum concrete slabs will find broad employment in place of non-porous jambs. In the long term we will master the output of roofing planking and roof slabs with insulation applied to them under plant conditions. The search for reserves is also proceeding in other directions. For example, experience has shown that the ductless



laying of heating systems provides a 35-40 percent reduction of labor expenditures. Our sanitation and technical installation organizations are mastering this method more and more widely.

A rise in the plant readiness of articles and the transfer of a number of operations from the construction site to plant conditions is a task which is facing the industrial enterprises of the district in the current five-year plan. The reserves here are tremendous. For example: improvement in the quality of finishing hollow flooring alone provides a savings of three man-days for every 100 square meters of surface. In recent years, we have made poor use of this reserve and there were cases of articles of low quality reaching the objects, which required considerable expenditures at the site. In order to avoid this, we are creating article finishing stations in the production shops.

In the Eleventh Five-Year Plan the level of specialization on construction and assembly work will be raised. In addition to the sanitation-technical and electric-wiring UNR's we have specialized UNR's: for the assembly of pre-fabricated houses, the establishment of zero cycles, the construction of brick houses, and the accomplishment of finishing and dirt-moving work. We also see a further rise in the productivity of labor in the deepening of specialization within each UNR. This is, first of all, the organization of finishing construction and assembly sectors (SMU) or contractors, the creation of brigades for gluing roofing material, the assembly of ferroconcrete frames, and the construction of exterior pipelines. As experience shows, the productivity of labor in specialized collectives is 10-12 percent higher than in regular ones.

We should dwell especially on the construction of our own production base as the material basis of our plans. If on the whole, capital investment in our own construction was put into operation during the Tenth Five-Year Plan, the increase in production capacities of plants for ferroconcrete and wooden articles was not accomplished. There is only one reason for this--a deadening of the sense of responsibility of leaders of construction organizations which erected facilities for the material-technical base and disrupted the times for their going into production. Long-range and current plans for the construction of these facilities have now been worked out and demandingness and monitoring of the performance of the work have been intensified.

In the current five-year plan we will put into operation: a shop for metal structural elements and gypsum-concrete dividing walls, cement and gypsum warehouses, and drying chambers of the industrial combine. Capacities for the production of pre-fabricated ferroconcrete will be increased. The motor vehicle and mechanization bases will be renovated.

I have told only about some of the reserves for raising the productivity of labor. There is no doubt that the Leningrad military builders, inspired by the historic plans of the 26th CPSU Congress, will also find other ways to raise the effectiveness of construction and will apply every strength for the successful accomplishment of their assigned tasks.

6367

CSO: 1801/295

END

**END OF**

**FICHE**

**DATE FILMED**

18 Sept 1981